BSP62

PNP Darlington transistor

2 May 2018 **Product data sheet**

1. General description

PNP Darlington transistor in an SOT223 plastic package.

NPN complement: BSP52

2. Features and benefits

- High current of -1 A
- Low voltage of -80 V
- Integrated diode and resistor
- AEC-Q101 qualified

3. Applications

- Industrial switching applications such as:
  - Print hammer
  - Solenoid
  - Relay and lamp drivers

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-	-90	V
V_{CES}	collector-emitter voltage	base short-circuited to emitter		-	-	-80	V
I_C	collector current			-	-	-1	A
I_{CM}	peak collector current			-	-	-2	A
h_{FE}	DC current gain	V_{CE} = -10 V; I_C = -150 mA	[1]	1000	-	-	

[1] Pulse test: $t_p \leq 300\ \mu s$; $\delta \leq 0.02$

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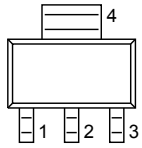
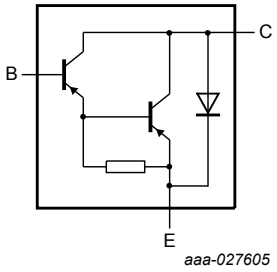
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SC-73 (SOT223)	
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BSP62	SC-73	plastic, surface-mounted package with increased heatsink; 4 leads; 4.6 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
BSP62	BSP62

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-90	V
V_{CES}	collector-emitter voltage	base short-circuited to emitter		-	-80	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-1	A
I_{CM}	peak collector current			-	-2	A
I_{Blim}	limiting base current			-	-100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	1.25	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	-	98	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	17	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm^2.

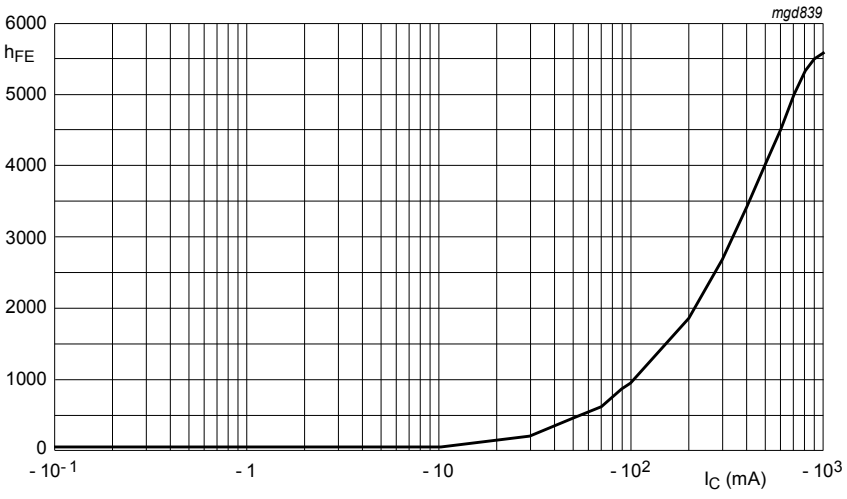
10. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I_C = -100 µA; I_E = 0 A		-90	-	-	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	I_C = -2 mA; V_{BE} = 0 V		-80	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_C = 0 A; I_E = -100 µA		-5	-	-	V
I_{CES}	collector-emitter cut-off current	V_{BE} = 0 V; V_{CE} = -80 V		-	-	-50	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = -4 V; I_C = 0 A		-	-	-50	nA
h_{FE}	DC current gain	V_{CE} = -10 V; I_C = -150 mA	[1]	1000	-	-	
		V_{CE} = -10 V; I_C = -500 mA	[1]	2000	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -500 mA; I_B = -0.5 mA		-	-	-1.3	V
		I_C = -500 mA; I_B = -0.5 mA; T_j = 150 °C		-	-	-1.3	mV
V_{BEsat}	base-emitter saturation voltage	I_C = -500 mA; I_B = -0.5 mA		-	-	-1.9	V
t_{on}	turn-on time	I_C = -500 mA; I_{Bon} = -0.5 mA; I_{Boff} = 0.5 mA		-	400	-	ns
t_{off}	turn-off time			-	1500	-	ns
f_T	transition frequency	V_{CE} = -5 V; I_C = -500 mA; f = 100 MHz		-	200	-	MHz

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$



V_{CE} = -10 V

Fig. 1. DC current gain; typical values

11. Test information

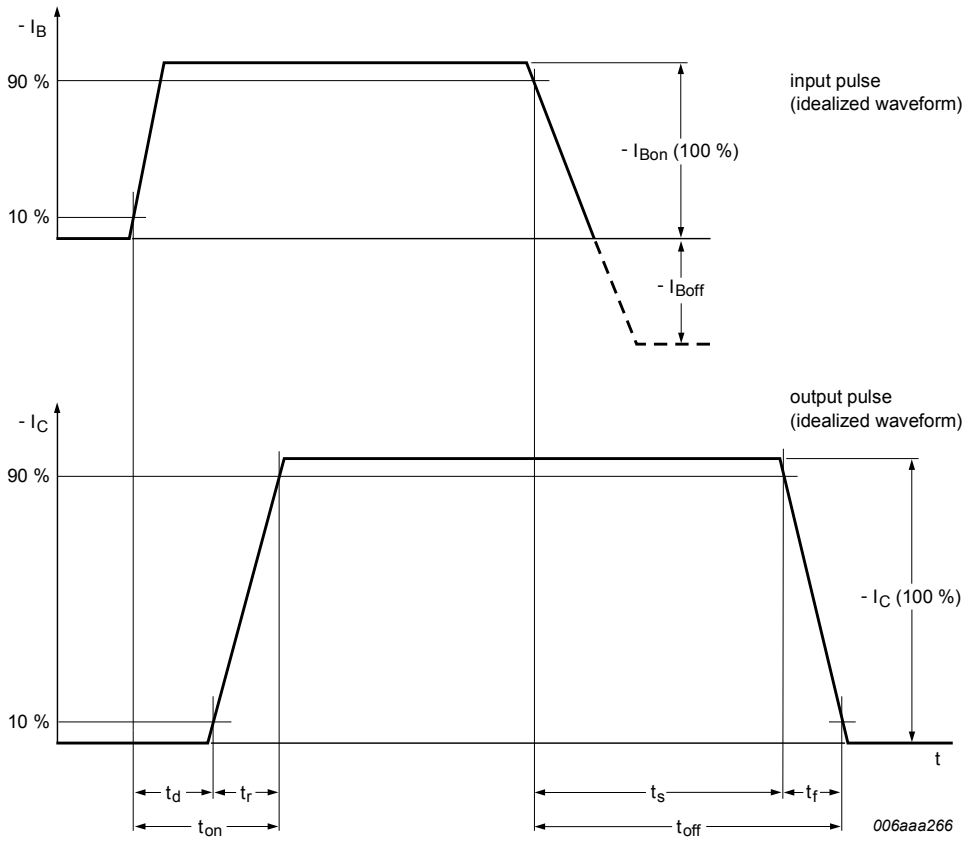
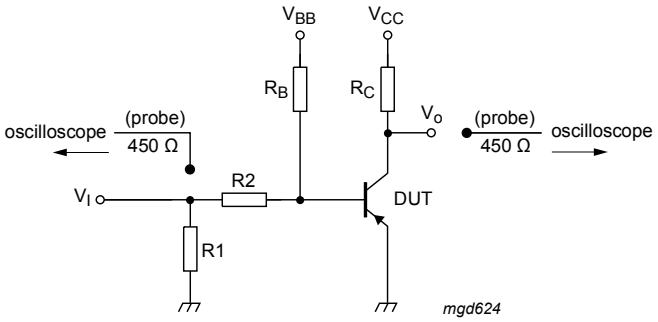


Fig. 2. Transistor switching time definition



V_I = -10 V; T = 200 µs; t_p = 6 µs; t_r = t_f ≤ 3 ns.
R1 = 56 Ω; R2 = 10 kΩ; R_B = 10 kΩ; R_C = 18 Ω.
V_{BB} = 1.8 V; V_{CC} = -10.7 V.
Oscilloscope: input impedance Z_i = 50 Ω.

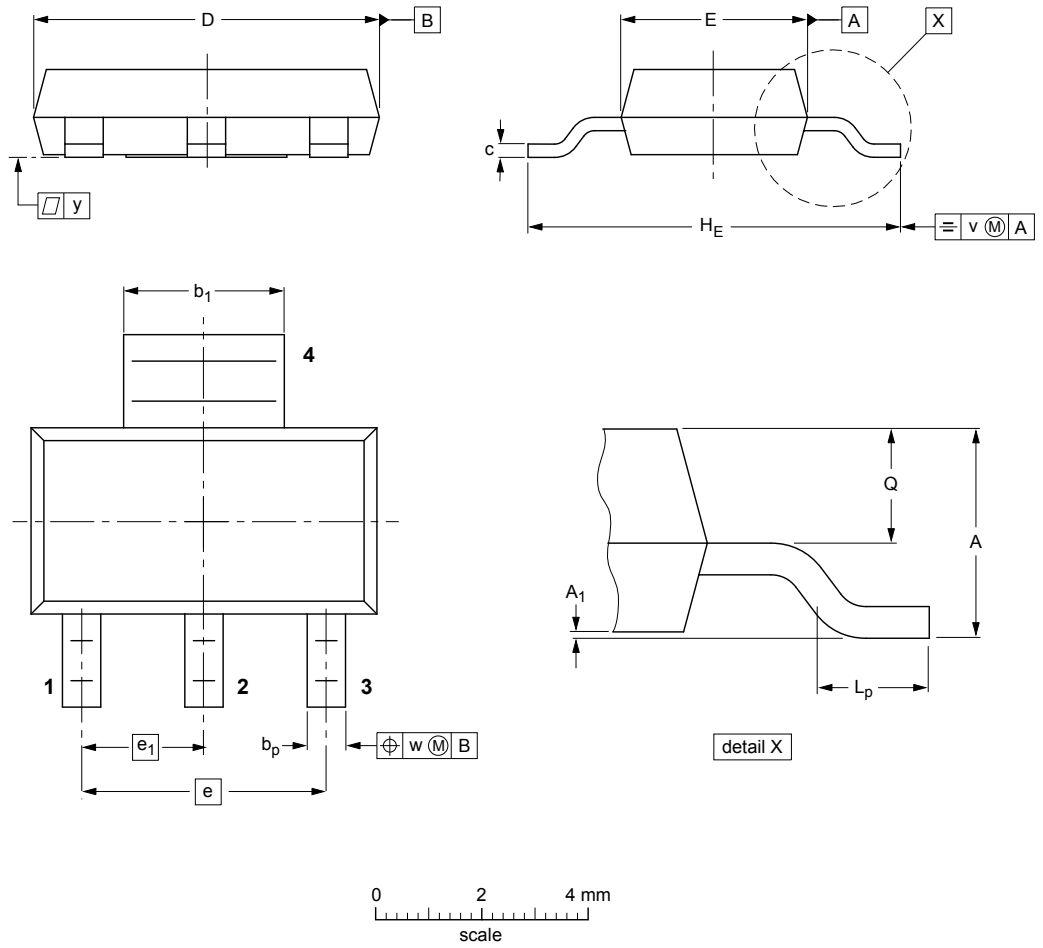
Fig. 3. Test circuit or switching times

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT223			SC-73			~~04-11-10~~ 06-03-16

Fig. 4. Package outline SC-73 (SOT223)

13. Soldering

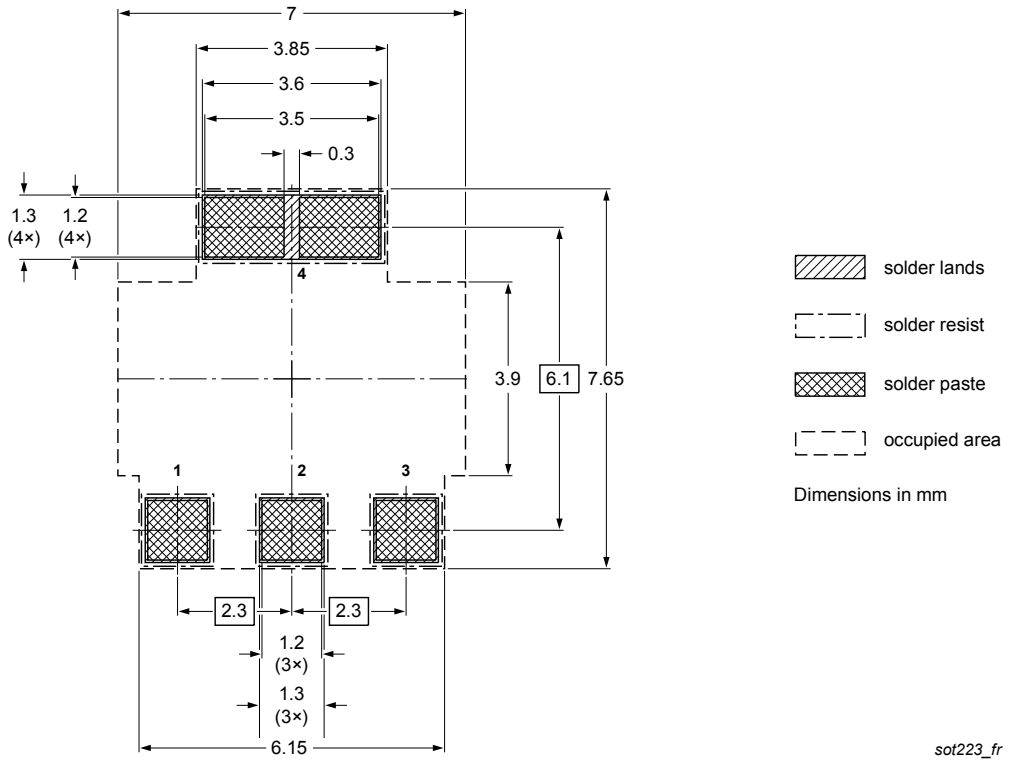


Fig. 5. Reflow soldering footprint for SC-73 (SOT223)

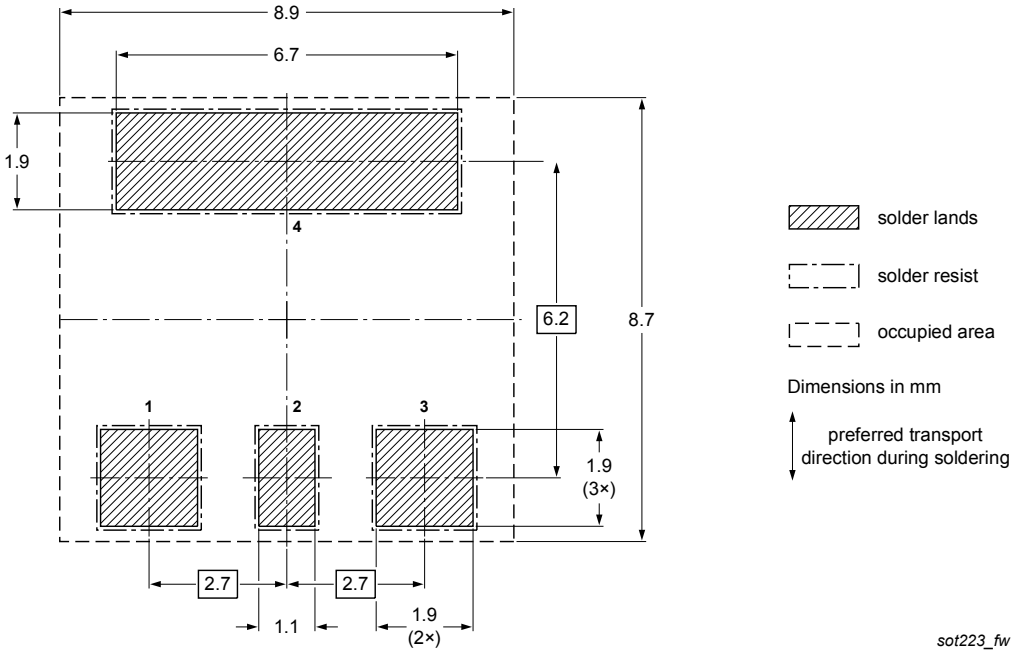


Fig. 6. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BSP62 v.4	20180502	Product data sheet	-	BSP62 v.3
Modifications:	• I_{CES} values corrected.			
BSP62 v.3	20180216	Product data sheet	-	BSP60_61_62 v.2

15. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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16. Contents

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